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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Carr et al.

Application No.: 09/689,289

Filed: October 11, 2000

For: PRINTING MEDIA AND METHODS
EMPLOYING DIGITAL
WATERMARKS

Examiner: B. Bayat

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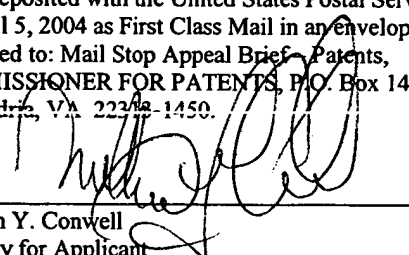
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Art Unit 3621

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I. REAL PARTY IN INTEREST

The real party in interest is Digimarc Corporation, by an assignment from the inventors recorded at Reel 11520, Frames 832-33, on February 1, 2001.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-21 stand finally rejected and are appealed.

IV. STATUS OF AMENDMENTS

All earlier-filed amendments have been entered.

Submitted herewith is an amendment correcting apparent errors in claims 20 and 21.

(The attached Appendix A shows the claims after such amendment.)

V. SUMMARY OF THE INVENTION

Applicants' invention relates to the use of digital watermarks in connection with envelopes and other documents, to provide enhanced functionality and new features.

Digital watermarking is the science of hiding secret information – often in some other data, and without leaving any apparent evidence of data alteration.¹

Digital watermarking can take many forms - several are detailed in patent documents incorporated-by-reference in the present specification.² One form of digital watermarking favored by the present Applicants involves making subtle changes to the luminance of pixels comprising a printed indicia (e.g., a postal meter stamp, sometimes known as a “franking mark”³) to thereby encode a hidden multi-bit auxiliary data payload. The changes are too slight

¹ Digital watermarking is a well developed art that is not belabored in the present specification. Instead, the present specification incorporates-by-reference earlier patents and applications on the subject, as detailed in fn. 2.

² See, e.g., specification, page 4, line 29 through page 5, line 1; page 15, line 4; and the incorporation by reference language found at page 15, lines 7-9.

³ See, e.g., specification, page 2, lines 15-16.

to be perceptible to human viewers of the indicia. But when such a watermark-encoded indicia is captured and computer analyzed, the multi-bit payload can be recovered, and a corresponding action can be triggered thereby.

When digitally watermarking a blank substrate – such as an unprinted envelope – there is no indicia to subtly change. In such cases, digital watermarking can still be effected, e.g., by depositing tiny speckles of ink⁴ to give the envelope a slight tint.⁵ Again, the droplets of ink define a pattern that can be sensed by a compliant decoder, and the multi-bit data can be decoded therefrom.

Alternatively, another way to realize a digital watermark is to create a subtle texture pattern on a surface. The micro-topological features of the texture appear substantially uniform to human inspection, but analysis of scan data corresponding thereto reveals deliberate patterning that encodes the multi-bit auxiliary data.⁶

Common to all forms of digital watermarks is the fact that data is encoded in hidden fashion, without leaving human apparent evidence of its presence.⁷

Digital watermarks can be divided into two classes: robust and fragile.⁸ Robust digital watermarks are designed to survive through various forms of document corruption, such as scanning by a flatbed scanner, conversion into a JPEG image file, and subsequent printing by an ink-jet printer. Despite such transformations a robust watermark can still be decoded.

Fragile digital watermarks, on the other hand, are designed to *not* withstand such processing.⁹

In accordance with one aspect of the invention, an original envelope has a fragile digital watermark formed thereon, representing plural bits of digital data.¹⁰ Since the fragile watermark will not persist through a photocopying operation, the watermark serves as a hallmark permitting a photocopy of the envelope to be distinguished from the original.

⁴ Specification, page 7, line 13.

⁵ Specification, page 2, line 26; page 14, line 26; and application 09/127,502 incorporated by reference at page 5, line 1 (now patent 6,345,104).

⁶ See, e.g., specification, page 7, lines 15-20.

⁷ Specification, page 4, lines 9-11.

⁸ Fragile watermarks are sometimes termed “frail.”

⁹ Specification, page 2, lines 4-8; page 6, lines 14-21.

¹⁰ Claim 1.

In accordance with a further aspect of the invention, such an envelope with a fragile digital watermark can also include a second digital watermark – one that withstands at least certain photocopying operations (i.e., is “robust”).¹¹ This second watermark can serve a variety of purposes.

For example, the data conveyed by the second watermark can serve to direct a web browser to a web page that corresponds to the digitally watermarked envelope.¹² Alternatively, the data conveyed by the second watermark can identify the person or device that originated the envelope.¹³ Still further, either watermark can signal – to a compliant photocopier – that the envelope should not be reproduced.¹⁴

The digital watermark can be formed on the envelope at a variety of different times. For example, it may be applied simultaneously with franking mark,¹⁵ and may even be printed by the same device used to print the franking mark.¹⁶

The digital watermark(s) can be formed on the envelope at a variety of different places. For example, a watermark can occupy a region that is also occupied by a franking mark.¹⁷ Alternatively, the watermark that persists through photocopying (the robust watermark) can be printed on a side of the envelope opposite a digital watermark that does not survive through photocopying (the fragile watermark).¹⁸

While the foregoing discussion has focused on digital watermarks as applied to envelopes, other aspects of the invention extend to other substrates – e.g., blank substrates suitable for later printing.¹⁹ Again, such a substrate can be marked with a fragile digital watermark, to permit photocopies of a document printed thereon to be distinguished from the original.²⁰ Likewise, such a substrate can also be marked with a second digital watermark that

¹¹ Claim 4.

¹² Claim 5.

¹³ Claim 6.

¹⁴ Claim 7.

¹⁵ Claim 8.

¹⁶ Claim 9.

¹⁷ Claim 10.

¹⁸ Claim 11.

¹⁹ Claim 14.

²⁰ *Ibid.*

withstands at least certain photocopying operations.²¹ The watermark(s) can serve the purposes detailed earlier, including permitting linking to internet sites, identifying the originator of the document, and signaling to compliant reproduction equipment that the document should not be reproduced.²²

VI. ISSUES

1. Did the Office meet its burden in rejecting claims 1, 8-10 and 12-14 as anticipated by Gilham (4,934,846), when Gilham fails to teach each of the claims' limitations?

2. Did the Office establish *prima facie* obviousness of claims 2-4, 6, 7, 15-17, 19 and 21 over Gilham in view of Bloom (6,332,194), when (a) both references fail to teach the limitations for which they are cited, and (b) none of the art suggests the selective modifications and combinations needed to yield the claimed combinations?

3. Did the Office establish *prima facie* obviousness of claims 5 and 18 over Gilham in view of Moskowitz (5,822,432), when the cited references – collectively – do not teach or suggest limitations required by these claims, and fail to suggest the selective modifications and combinations needed to yield the claimed combinations?

4. Did the Office establish *prima facie* obviousness of claims 11 and 20 over Gilham in view of Daigneault (6,334,678), when the art fails to teach that for which it is cited, and the proposed combinations are based on hindsight reconstruction?

VII. GROUPING OF CLAIMS

Each of the claims is separately patentable, as detailed below.

VIII. ARGUMENT - § 102

Claims 1, 8-10, and 12-14 stand rejected as anticipated by Gilham (4,934,846).

²¹ Claim 17.

²² Claims 18, 19 and 21.

Gilham is understood to disclose a mail franking arrangement, in which the printed postal indicia comprises two parts: a human-readable part (11), and a machine-readable part (12). The machine-readable part is a bar code (*"The franking data may be printed on the mail item in the form of a bar code consisting of spaced bar code marks of differing width"*²³). This arrangement is shown in Gilham's Fig. 1:

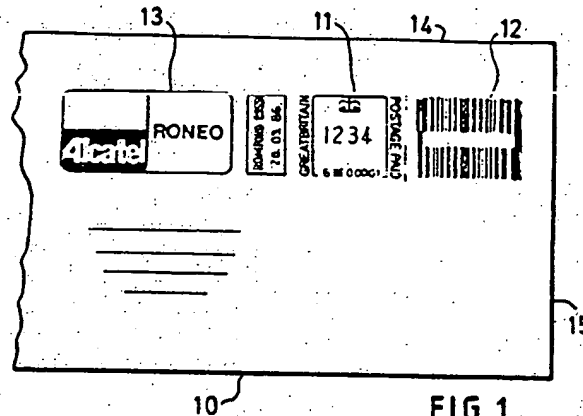


FIG. 1.

The Examiner wrongly asserts that Gilham teaches a digital watermark – confusing a digital watermark and a bar code. Gilham's bar code is not a digital watermark. Gilham's bar code is not hidden – it is overt. And Gilham's bar code leaves human-apparent evidence of data representation. This is the antithesis of a digital watermark.²⁴

(A crude analogy to Gilham's barcode may be text written in Sanskrit - an ancient symbology. Persons viewing the marking would not necessarily know the exact sequence of information thereby represented. And the *meaning* of the markings is hidden. But this does not mean such marking is a form of digital watermarking. Again, the marking isn't hidden, and it leaves human-apparent evidence of data representation.)

²³ Gilman, col. 2, lines 5-7.

²⁴ Specification, page 4, lines 9-11: *"Digital watermarking technology, a form of steganography, encompasses a great variety of techniques by which plural bits of digital data are hidden in some other object without leaving human-apparent evidence of alteration or data representation."* (Emphasis added.)

Indeed, in his obviousness rejections the Examiner tacitly admitted Gilham's failure to teach watermarking by his statement "Gilham does not explicitly teach the use of various forms of watermarking techniques." (Final Rejection, page 5, lines 21-22.)

The Examiner's misunderstanding of the term "digital watermark," and his disregard of the definition provided by applicants in their specification (page 4, lines 9-11), is an error that fatally flaws all of the Examiner's rejections.²⁵

1. **Claim 1**

Claim 1 is not anticipated by Gilham. The claim reads:

1. An original envelope having encoded thereon a fragile digital watermark representing plural bits of digital data, said watermark permitting a photocopy thereof to be distinguished from the original.

As noted above, Gilham uses a bar code – the antithesis of a digital watermark (i.e., not hidden, and leaves human-apparent evidence of data representation).

Moreover, claim 1 specifies that the claimed digital watermark is "fragile," and permits "a photocopy thereof to be distinguished from the original."

Gilham does not teach a fragile watermark. Nor does he teach *any* technology permitting a photocopy to be distinguished from the original. Gilham does not even contemplate this issue of distinguishing a copy from an original.

Accordingly, claim 1 is not anticipated by Gilham, and the rejection should be reversed.

2. **Claim 8**

Claim 8 depends from claim 4, and is said to be anticipated by Gilham.

However, base claim 4 is not alleged to be anticipated by Gilham, but rather has been rejected over Gilham + Bloom.

Since claim 8 incorporates all of the limitations of claim 4, the "anticipation" rejection of claim 8 is fatally flawed.

Moreover, Gilham doesn't teach the limitations detailed in claim 8 (e.g., involving a second watermark – one that is printed at the same time as a franking mark).

²⁵ Applicants suggested that the Examiner consult with colleagues in Group Art Unit 2621 (whose expertise lies in digital watermarking), and particularly offered names and phone numbers of two such examiners. (Amendment filed June 16, 2003, page 6.) However, the present Examiner apparently failed to do so.

Again, reversal is required.

3. **Claim 9**

Claim 9 depends from claim 8, and is said to be anticipated by Gilham.

Again, through claim 8's dependence on claim 4 – which is not alleged to be anticipated – the anticipation rejection of claim 9 fails.

Moreover, Gilham doesn't teach the limitations detailed in claim 8 (e.g., involving a second watermark – one that is printed by the same assembly used to print the franking mark).

Again, reversal is required.

4. **Claim 10**

Claim 10 depends from claim 4, and is said to be anticipated by Gilham.

Again, base claim 4 is not alleged to be anticipated by Gilham, but rather has been rejected over Gilham + Bloom.

Since claim 10 incorporates all of the limitations of claim 4, the “anticipation” rejection of claim 10 is fatally flawed.

Moreover, Gilham doesn't teach the limitations detailed in claim 8 (e.g., specifying that a digital watermark occupies a region that is also occupied by a franking mark).

Again, reversal is required.

5. **Claim 12**

Claim 12 depends from claim 1, and is allowable for the reasons noted earlier in connection with claim 1.

Additionally, claim 12 is independently patentable because it specifies that the digital watermark is printed on the envelope at the same time as a franking mark. Gilham has no teaching concerning printing a digital watermark at the same time as a franking mark.

Again, reversal is required.

6. **Claim 13**

Claim 13 depends from claim 1, and is allowable for the reasons noted earlier in connection with claim 1.

Additionally, claim 13 is independently patentable because it specifies that the digital watermark is printed on the envelope by the same printing assembly used to print a franking mark. Gilham has no teaching concerning printing a digital watermark by the same printing assembly used to print a franking mark.

Again, reversal is required.

7. **Claim 14**

Claim 14 is an independent claim that is said to be anticipated by Gilham. The claim reads:

14. A blank original substrate suitable for later use in a printing operation to produce a printed document, the blank original substrate having encoded thereon a fragile digital watermark representing plural bits of digital data, said watermark permitting a photocopy thereof to be distinguished from the original.

Again, as discussed above in connection with claim 1, Gilham uses a bar code – the antithesis of a digital watermark (i.e., not hidden, and leaves human-apparent evidence of data representation).

Moreover, claim 14 again specifies that the claimed digital watermark is “fragile,” and permits “a photocopy thereof to be distinguished from the original.”

Gilham does not teach a fragile watermark. Nor does he teach *any* technology permitting a photocopy to be distinguished from the original. Gilham does not even contemplate this issue of distinguishing a copy from an original.

Still further, claim 14 is drawn to a “blank original substrate suitable for later use in a printing operation to produce a printed document...” Gilham does not teach, or concern, blank substrates.

Accordingly, claim 14 is not anticipated by Gilham, and the rejection should be reversed.

IX. ARGUMENT - § 103

As a preliminary matter, it should be noted that the three § 103 rejections are initially set forth as based on single references, but are thereafter detailed as being based on that reference in combination with Gilham. Accordingly, in the arguments that follow, the obviousness rejections are treated as based on combinations with Gilham – since that appears to have been the Examiner’s intent.

1. Bloom Rejections

Claims 2-4, 6, 7, 15-17, 19 and 21 stand rejected over Gilham in view of Bloom (6,332,194).

Bloom concerns a method of enhancing the encoding of a digital watermark to enhance its subsequent detectability, and is particularly focused on watermarks conveyed with digitized video or image signals to signal permitted copy operations (e.g., “copy-once,” “copy freely,” and “copy no more”).

2. Claim 2

Claim 2 depends from claim 1, and is allowable for reasons discussed above in connection with claim 1.

Additionally, claim 2 is independently allowable. For example, claim 2 adds to claim 1 the limitation that the watermark is formed with ink.

Bloom appears to have no disclosure of ink used in watermarks.

Accordingly, even if the teachings of Gilman and Bloom were combined, the claimed arrangement could not result.

Moreover, the Examiner has not offered a sufficient rationale in support of the combination. In support of the combination of claim 2 (and also claim 3, and claim 4, and claim 6, and claim 7, and claim 15, and claim 16, and claim 17, and claim 19, and claim 21) the Examiner only says:

Bloom et al is evidence that one of ordinary skill in the art would recognize the benefit of utilizing various watermarking techniques and multiple watermarks to accomplish several verification or authentication tasks. Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to modify the invention to utilize such techniques to accomplish the above stated purpose, as per teachings of Bloom et al.

Nothing in this explanation suggests why an artisan would have been led to disregard Gilham's teaching concerning a bar code. Nothing in this explanation suggests why an artisan would have been concerned with distinguishing a photocopy from an original (as independent claim 1 requires). Nothing in this explanation addresses the "ink" limitation of claim 2.

Accordingly, the Examiner has failed to set forth a *prima facie* case under § 103, and the rejection should be reversed.

3. Claim 3

Claim 3 depends from claim 1, and is allowable for reasons discussed above in connection with claim 1.

Additionally, claim 3 is independently allowable. For example, the claim specifies that the watermark is formed by texturing of the original envelope medium.

Again, Bloom has no disclosure of such a teaching. (He refers to "texture,"²⁶ but this is of a digital signal – and refers to local variation in pixel values. It does not concern physical medium texturing, as called for by claim 3.)

Again, there is no rationale explaining why an artisan would be led to disregard Gilham's teaching concerning a barcode. There is no suggestion leading an artisan instead to employ texturing of an envelope medium. Again, nothing in the Action suggests why an artisan would have even been concerned with distinguishing a photocopy from an original.

Again, the requisites of a § 103 rejection have not been made out, and the rejection should be reversed.

4. Claim 4

Claim 4 depends from claim 1, and is allowable for reasons discussed above in connection with claim 1.

²⁶ Bloom, col. 5, line 11.

Additionally, claim 4 is independently allowable. For example, the claim specifies that the envelope additionally has a second digital watermark – one that withstands at least certain photocopying operations.

Bloom is silent on arrangements employing two watermarks: one fragile and one that withstands certain photocopying operations. Accordingly, the cited references cannot be combined to yield the claimed arrangement.

Again, the Examiner has not offered a rationale explaining why the earlier-noted teachings of Gilham should be disregarded, and why features not present in any of the cited art should instead be employed.

Again, the Examiner has not established obviousness, and the rejection should be reversed.

5. Claim 6

Claim 6 depends from claim 4 (which depends from claim 1), and is allowable for reasons discussed above in connection with claims 4 and 1.

Additionally, claim 6 is independently allowable. For example, the claim specifies that the second digital watermark (i.e., the one that withstands at least certain photocopying operations) encodes data representing a device or user that produced the document.

(This is not the “watermark” wrongly said by the Examiner to be taught by Gilham – that watermark is alleged to be fragile.)

Again, Bloom contains no teaching of such a limitation. The cited references – even if combined with hindsight – can not be jig-sawed together to yield the arrangement of claim 6.

Again, the Examiner has failed to offer any rationale for the proposed combination that meets the statutory standards.

Again, the rejection should be reversed.

6. Claim 7

Claim 7 also depends from claim 4 (which depends from claim 1), and is allowable for reasons discussed above in connection with claims 4 and 1.

Additionally, claim 7 is independently allowable. For example, the claim specifies that one of the two digital watermarks indicates to compliant equipment that the envelope should not be reproduced.

Again, Bloom fails to provide any teaching or suggestion that would have led an artisan to disregard Gilham's barcode teachings, modify other teachings, provide a second watermark, and utilize the two watermarks in the manner set forth in claim 7.

Again, the rejection should be reversed.

7. Claim 15

Claim 15 depends from claim 14, and is allowable for reasons discussed above in connection with claim 14.

Additionally, claim 15 is independently allowable. For example, claim 15 specifies that the watermark on the blank original substrate of claim 14 is formed of ink.

Again, Bloom contains no teaching of ink. Nor does Bloom contemplate any watermarking of "blank" substrates. Nor does Bloom cure Gilham's failure to address distinguishing a photocopy from an original. Nor is there any suggestion in the art (or in the Examiner's proffered rationale) to disregard the teachings of Gilman and that instead leads to the combination defined by claim 15.

Again, the rejection fails to meet the requirements of the statute and should be reversed.

8. Claim 16

Claim 16 depends from claim 14, and is allowable for reasons discussed above in connection with claim 14.

Additionally, claim 16 is independently allowable. For example, claim 16 specifies that the watermark on the blank original substrate of claim 14 is formed by texturing the substrate medium.

Again, Bloom is silent on texturing a substrate medium. Even with hindsight, elements of the cited art cannot be combined to yield the claimed combination.

Again, the Examiner has failed to offer an explanation justifying the proposed disregard of Gilham's barcode teachings, and the adoption of other teachings not found in the cited art.

Again, the rejection should be reversed.

9. **Claim 17**

Claim 17 depends from claim 14, and is allowable for reasons discussed above in connection with claim 14.

Additionally, claim 17 is independently allowable. For example, the claim specifies that the blank substrate additionally has a second digital watermark – one that withstands at least certain photocopying operations.

Again, Bloom is silent on arrangements employing two watermarks: one fragile and one that withstands certain photocopying operations. Accordingly, the cited references cannot be combined to yield the claimed arrangement.

Again, the Examiner has not offered a rationale explaining why the earlier-noted teachings of Gilham should be disregarded, and features not present in any of the cited art should instead be employed.

Again, the Examiner has not established obviousness, and the rejection should be reversed.

10. **Claim 19**

Claim 19 depends from claim 17 (which depends from claim 14), and is allowable for reasons discussed above in connection with claims 17 and 4.

Additionally, claim 19 is independently allowable. For example, the claim specifies that the second digital watermark (i.e., the one that withstands at least certain photocopying operations) encodes data representing a device or user that produced the document.

(Again, this is *not* the “watermark” wrongly said by the Examiner to be taught by Gilham – that watermark is alleged to be fragile.)

Again, Bloom contains no teaching of such a limitation. The cited references – even if combined with hindsight – could not be jig-sawed together to yield the arrangement of claim 19.

Again, the Examiner has failed to offer any rationale for the proposed combination that meets the statutory standards.

Again, the rejection should be reversed.

11. Claim 21

Claim 21 depends from claim 14, and is allowable for reasons discussed above in connection with claims 14.

Additionally, claim 21 is independently allowable. For example, the claim specifies that the fragile watermark indicates to compliant equipment that the document should not be reproduced.

Again, Bloom fails to provide any teaching or suggestion that would have led an artisan to disregard Gilham's barcode teachings, modify other teachings, and utilize the fragile watermark both to distinguish a photocopy from an original, and also to indicate to compliant equipment that the document should not be reproduced, as detailed in claim 21.

Again, a *prima facie* rejection has not been made, and the rejection should thus be reversed.

12. Moskowitz Rejections

Claims 5 and 18 stand rejected over Gilham in view of Moskowitz (5,822,432).

Moskowitz addresses certain digital watermark technologies and applications. One is to encode a stream of digital content with a URL that identifies an on-line site where content similar to the encoded content might be found.²⁷

13. Claim 5

Claim 5 depends from claim 4. However, claim 4 is not rejected over Gilham + Moskowitz (but is instead rejected over Gilham + Bloom). Accordingly, it is not believed that a rejection of claim 5 over Gilham + Moskowitz can stand.

Claim 5 is allowable for reasons discussed above in connection with claims 4 and 1.

²⁷ Moskowitz, col. 9, lines 37-40.

Additionally, claim 5 is independently allowable. For example, the claim specifies that the *second* digital watermark (i.e., the one that withstands at least certain photocopying operations) encodes data useful for linking to an internet computer site.

Moskowitz contains no teaching curing Gilham's failure to teach a watermark-based arrangement permitting a photocopy of an envelope to be distinguished from the original. Nor does Moskowitz contain any teaching concerning use of two watermarks: one fragile, and one that withstands at least certain photocopying. While Moskowitz mentions encoding content with a URL, the content with which he is concerned is digital streaming content – not an envelope.

Again, a *prima facie* rejection has not been established, and the rejection should be reversed.

14. Claim 18

Claim 18 depends from claim 17. Again, however, claim 17 is not rejected over Gilham + Moskowitz (but is instead rejected over Gilham + Bloom). Accordingly, it is not believed that a rejection of claim 18 over Gilham + Moskowitz can stand.

Claim 18 is allowable for reasons discussed above in connection with claims 17 and 14.

Additionally, claim 18 is independently allowable. For example, none of the cited art teaches or suggests encoding a blank substrate with data useful for linking to an internet computer site.

Again, the Examiner has failed to meet the statutory requirements for an obviousness rejection.

15. Daigneault Rejections

Claims 11 and 20 stand rejected over Gilham in view of Daigneault (6,334,678).

Daigneault is understood to disclose *chemical* treatment of paper to form a conventional (i.e., not digital) watermark.

16. Claim 11

Claim 11 depends from claim 4. However, claim 4 is not rejected over Gilham + Daigneault (but is instead rejected over Gilham + Bloom). Accordingly, it is not believed that a rejection of claim 11 over Gilham + Daigneault can stand.

Claim 11 is allowable for reasons discussed above in connection with claims 4 and 1.

Additionally, claim 11 is independently allowable. For example, claim 11 requires that the *second digital* watermark be formed on a second side of the envelope – opposite a side on which the first (fragile) watermark is formed.

Daigneault does not concern any digital watermarking. Rather, he concerns the sort of traditional paper watermark that is visible by holding a printed document to the light.

Accordingly, no combination of the teachings of the art can yield the arrangement of claim 11.

Again, a *prima facie* rejection has not been made, and the rejection should be reversed.

17. Claim 20

Claim 20 depends from claim 17. Again, however, claim 17 is not rejected over Gilham + Daigneault (but is instead rejected over Gilham + Bloom). Accordingly, it is not believed that a rejection of claim 20 over Gilham + Daigneault can stand.

Claim 20 is allowable for reasons discussed above in connection with claims 17 and 14.

Additionally, claim 20 is independently allowable. For example, claim 20 requires that the *second digital* watermark be formed on a second side of the document – opposite a side on which the first (fragile) watermark is formed. Again, the rejection provides no cognizable rationale that would have led an artisan to such an arrangement.

Again, the rejection is statutorily insufficient, and should be reversed.

X. CONCLUSION

The Examiner has misconstrued the "digital watermarking" limitations of the independent claims, and has proposed combinations with secondary references that are not suggested by the art, and that could not be implemented from the references' teachings even with hindsight.

Accordingly, the Board is requested to rule that claims 1-21 should be passed to issuance.

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Respectfully submitted,

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APPENDIX A
PENDING CLAIMS

1. An original envelope having encoded thereon a fragile digital watermark representing plural bits of digital data, said watermark permitting a photocopy thereof to be distinguished from the original.
2. The envelope of claim 1 in which the watermark is formed with ink.
3. The envelope of claim 1 in which the watermark is formed by texturing of the original envelope medium
4. The envelope of claim 1 that additionally has encoded thereon a second digital watermark that withstands at least certain photocopying operations.
5. The envelope of claim 4 in which the second digital watermark encodes data useful for linking to an internet computer site.
6. The envelope of claim 4 in which the second digital watermark encodes data representing a device or user that produced the document.
7. The envelope of claim 4 in which one of said watermarks indicates to compliant equipment that the envelope should not be reproduced.
8. The envelope of claim 4 in which the second digital watermark is printed on the envelope at the same time as a franking mark.
9. The envelope of claim 8 in which the second digital watermark is printed on the envelope by the same printing assembly used to print said franking mark.

10. The envelope of claim 4 in which at least one of said digital watermarks occupies a region that is also occupied by a franking mark printed on said envelope.

11. The envelope of claim 4 in which the second watermark is formed on a second side of the envelope, opposite a side on which the first watermark is formed.

12. The envelope of claim 1 in which said digital watermark is printed on the envelope at the same time as a franking mark.

13. The envelope of claim 1 in which said digital watermark is printed on the envelope by the same printing assembly used to print said franking mark.

14. A blank original substrate suitable for later use in a printing operation to produce a printed document, the blank original substrate having encoded thereon a fragile digital watermark representing plural bits of digital data, said watermark permitting a photocopy thereof to be distinguished from the original.

15. The substrate of claim 14 in which the watermark is formed with ink.

16. The substrate of claim 14 in which the watermark is formed by texturing of the substrate medium.

17. A printed document comprising the substrate of claim 14 that additionally has encoded thereon a second digital watermark that withstands at least certain photocopying operations.

18. The document of claim 17 in which the second digital watermark encodes data useful for linking to an internet computer site.

19. The document of claim 17 in which the second digital watermark encodes data representing a device or user that produced the document.

20. The document of claim 17 in which the second watermark is formed on a second side of the document, opposite a side on which the first watermark is formed.

21. The substrate of claim 14 in which the watermark indicates to compliant equipment that the document should not be reproduced.